Configure a Cisco 6400 ATM Interface With RBE and DHCP

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Introduction

This document provides a sample configuration for a Cisco 827 Digital Subscriber Line (DSL) Router connected to a Cisco 6130 Digital Subscriber Line Access Multiplexer (DSLAM), that terminates on a Cisco 6400 Universal Access Concentrator (UAC).

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco 827-4V customer premises equipment (CPE) with IOS® Software Release 12.1(1)XB.
- Cisco 6400 UAC-NRP IOS Software Release 12.1(1)DC1 (external DHCP server) or 12.2(2)B (IOS DHCP server).
- Cisco 6400 UAC-NSP IOS Software Release 12.0(4)DB.
- Cisco 6130 DSLAM-NI2 IOS Software Release 12.1(1)DA.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is

live, make sure that you understand the potential impact of any command.

Conventions

For more information on document conventions, refer to Cisco Technical Tips Conventions.

Background Information

The Cisco 827 is configured with RFC1483 Bridging and integrated routing and bridging (IRB). The Cisco 827 allows PCs on the Ethernet segment to obtain addresses from a DHCP server behind the 6400, or from the 6400 IOS DHCP server. In addition, the BVI address has also been configured to obtain an address and default route from the DHCP server. The Cisco 6400 asynchronous transfer mode (ATM) interface is configured with routed bridge encapsulation (RBE), and is configured to operate with either an external DHCP server or IOS DHCP server on the NRP.

For the Cisco 6400, the ATM RBE feature on the Cisco 6400 node route processor (NRP) routes IP over bridged RFC1483 Ethernet traffic from a stub-bridged LAN. Bridged IP packets received on an ATM interface configured in route-bridged mode are routed through the IP header. The interfaces take advantage of the characteristics of a stub LAN topology commonly used for DSL access, and offer increased performance and flexibility over IRB.

Also, host routes for DHCP clients are automatically added to the 6400 routing table as IP addresses are handed out. The host routes are removed from the routing table when the DHCP address is released.

Configure

In this section, you are presented with the information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

Network Diagram

This document uses the network setup shown in figures 1 and 2:

Figure 1 – Scenario 1 Figure 2 – Scenario 2

Configurations

This document uses these configurations:

- Cisco 827
- Cisco 6400 NRP
- 6400 Debug (Using RBE with External DHCP Server)
- 6400 Debug (Using RBE with IOS DHCP Server)

Cisco 827

```
Current configuration:
!
version 12.0
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname R1
!
ip subnet-zero
!
bridge irb
!
interface Ethernet0
 no ip address
 bridge-group 1
!--- Because the Ethernet0 is bridged to the WAN
interface, !--- PCs behind the ethernet0 can be setup as
DHCP clients. !--- They get their addresses from the
DHCP server behind the 6400, !--- or from the IOS DHCP
server on the 6400. ! interface ATM0 no ip address no ip
directed-broadcast no ip mroute-cache no atm ilmi-
keepalive pvc 4/100 encapsulation aal5snap ! bundle-
enable bridge-group 1 hold-queue 224 in ! interface BVI1
ip address dhcp client-id Ethernet0 !--- This command
tells the BVI interface to get the address !--- from
DHCP, and also to get the default route from DHCP. ! ip
classless !--- Note: The default route will be inserted
into !--- the routing table automatically from the DHCP
server, and !--- no static routing statement is
required.

no ip http server
!
bridge 1 protocol ieee
 bridge 1 route ip
!
voice-port 1
 timing hookflash-in 0
!
voice-port 2
 timing hookflash-in 0
!
voice-port 3
 timing hookflash-in 0
!
voice-port 4
 timing hookflash-in 0
!
end
```

Cisco 6400 NRP

```
Current configuration:
!
version 12.1
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname NRP

!
```

```
redundancy
 main-cpu
 no auto-sync standard
 no secondary console enable
ip subnet-zero
!
interface Loopback1
 ip address 198.1.1.1 255.255.255.0
 no ip directed-broadcast
!--- This address and mask must match the intended !---
scope and network configured on the external DHCP
server. ! interface ATM0/0/0 no ip address no ip
directed-broadcast no ip mroute-cache no ATM ilmi-
keepalive ! interface ATM0/0/0.4 point-to-point !--- The
interface ATM0/0/0.4 point-to-point uses IP !---
unnumbered Loopback1 for its IP address requirements. ip
unnumbered Loopback1 ip helper-address <dhcp server ip
address> atm route-bridged ip PVC 4/100 encapsulation
aal5snap ! interface Ethernet0/0/1 no ip address no ip
directed-broadcast ! interface Ethernet0/0/0 no ip
directed-broadcast ! interface FastEthernet0/0/0 no ip
address no ip directed-broadcast full-duplex ! ip
classless !--- Note: For every DHCP client that is
relayed an address, !--- a host route will be
automatically inserted in the routing !--- table, and no
host route statement for a DHCP client is required.

end
```

6400 Debug (Using RBE with External DHCP Server)

```
Current configuration:
!
version 12.1
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname NRP

!
redundancy
 main-cpu
 no auto-sync standard
 no secondary console enable
ip subnet-zero
!
interface Loopback1
 ip address 198.1.1.1 255.255.255.0
 no ip directed-broadcast
!--- This address and mask must match the intended !---
scope and network configured on the external DHCP
server. ! interface ATM0/0/0 no ip address no ip
directed-broadcast no ip mroute-cache no ATM ilmi-
keepalive ! interface ATM0/0/0.4 point-to-point !--- The
interface ATM0/0/0.4 point-to-point uses IP !---
unnumbered Loopback1 for its IP address requirements. ip
unnumbered Loopback1 ip helper-address <dhcp server ip
address> atm route-bridged ip PVC 4/100 encapsulation
aal5snap ! interface Ethernet0/0/1 no ip address no ip
directed-broadcast ! interface Ethernet0/0/0 no ip
directed-broadcast ! interface FastEthernet0/0/0 no ip
address no ip directed-broadcast full-duplex ! ip
```

```
classless !--- Note: For every DHCP client that is
relayed an address, !--- a host route will be
automatically inserted in the routing !--- table, and no
host route statement for a DHCP client is required.

end
```

6400 Debug (Using RBE with IOS DHCP Server)

```
Current configuration:
!
version 12.1
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname NRP

!
redundancy
 main-cpu
 no auto-sync standard
 no secondary console enable
ip subnet-zero
!
interface Loopback1
 ip address 198.1.1.1 255.255.255.0
 no ip directed-broadcast
!--- This address and mask must match the intended !---
scope and network configured on the external DHCP
server. ! interface ATM0/0/0 no ip address no ip
directed-broadcast no ip mroute-cache no ATM ilmi-
keepalive ! interface ATM0/0/0.4 point-to-point !--- The
interface ATM0/0/0.4 point-to-point uses IP !---
unnumbered Loopback1 for its IP address requirements. ip
unnumbered Loopback1 ip helper-address <dhcp server ip
address> atm route-bridged ip PVC 4/100 encapsulation
aal5snap ! interface Ethernet0/0/1 no ip address no ip
directed-broadcast ! interface Ethernet0/0/0 no ip
directed-broadcast ! interface FastEthernet0/0/0 no ip
address no ip directed-broadcast full-duplex ! ip
classless !--- Note: For every DHCP client that is
relayed an address, !--- a host route will be
automatically inserted in the routing !--- table, and no
host route statement for a DHCP client is required.

end
```

Verify

There is currently no verification procedure available for this configuration.

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- **Configuring a Cisco 827 Router Terminating on a Cisco 6400 in RBE Mode Using RFC1483 Bridging**
- **DSL Product Support Page**